

**UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ALABAMA
NORTHEASTERN DIVISION**

**AVOCENT HUNTSVILLE
CORPORATION,**

Plaintiff,

VS.

Civil Action No. CV-03-S-2875-NE

**CLEARCUBE TECHNOLOGY,
INC.,**

Defendant.

MEMORANDUM OPINION

Avocent Huntsville Corp. (“Avocent”) is the owner of two patents that concern transmission of computer video signals over extended distances: U.S. Patent No. 6,150,997 (“‘997 patent”); and U.S. Patent No. 6,184,919 (“‘919 patent”). Avocent’s suit against ClearCube Technology, Inc. (“ClearCube”), claims that ClearCube’s computer systems infringe claim 1 of the ‘997 patent, and claims 1, 6, and 16-18 of the ‘919 patent.¹

The first task in any patent infringement case is that of “claim construction,” the interpretation of words used in a patent’s claims, “the portion of the patent document that defines the scope of the patentee’s rights.” *Markman v. Westview*

¹ Doc. no. 1 (complaint); *see also* doc. no. 125 (Avocent Huntsville's Summary and Background of the Technology Embodied in the Claims of the Patents-in-Suit), at 1.

Instruments, Inc., 517 U.S. 370, 372 (1996); *see also, e.g., Rockwell International Corporation v. United States*, 147 F.3d 1358, 1362 (Fed. Cir. 1998) (“The first step in any invalidity or infringement analysis is claim construction.”) (citations omitted). The parties’ claim construction contentions were set forth in a Joint Claim Construction and Pre-Hearing Statement,² the relevant issues were briefed,³ and the court conducted a claim construction hearing on February 22 and 23, 2006.

PART ONE

Background of the Technology

A typical personal computer is connected to a monitor by a cable that generally is no more than ten to twenty feet in length because the monitor, in most applications, is located near the computer’s central processing unit (“CPU”).⁴ The cable carries video signals from the CPU to the monitor, where they are displayed as images on a screen.

Avocent was known as Cybex Computer Products Corporation prior to 2000.⁵ Cybex was in the business of developing products that allowed customers to locate

² Doc. no. 78.

³ *See* doc. no. 79 (Avocent’s Combined Memorandum in Support of its *Markman* Claim Construction Contentions); doc. no. 84 (ClearCube’s Response and Memorandum in Support of its *Markman* Claim Construction Contentions); doc. no. 89 (Avocent’s Combined Reply in Support of its *Markman* Claim Construction Contentions).

⁴ *See* doc. no. 125 (Avocent Huntsville’s Summary and Background of the Technology Embodied in the Claims of the Patents-in-Suit), at 5 n.2.

⁵ *See id.* at 5.

CPUs at extended distances from a user's monitor, keyboard, and mouse.⁶ In a business setting, this resulted in less clutter at each user's workstation, as well as increased security. As Avocent explained:

If the video, keyboard and mouse signals can be reliably transmitted over extended distances, the computers themselves can be located in a backroom where only an authorized computer administrator can physically access them. This prevents unauthorized software or files from being installed on the computers or copied from the computers.⁷

The problem inherent in such configurations is that video signals degrade when transmitted over extended distances, resulting in undesirable debasement of clarity in the images depicted on the monitor's screen.⁸

Cybex's early innovations in the field were tailored to digital, as opposed to analog, video signal transmission. That was due to the fact that, during the 1980s, the leading computer video signal standard was the so-called Color Graphics Adapter ("CGA") generated by IBM for use in its personal computers and other products.⁹ After CGA, IBM introduced a new video standard, called the Enhanced Graphics Adapter ("EGA"). CGA and EGA were both digital video standards; that is, each "bit" of signal information was expressed as either a "1" or "0" value. Cybex's

⁶ See *id.* at 1-2.

⁷ *Id.* at 2.

⁸ See Transcript of *Markman* Hearing, Vol. I (Feb. 22, 2006 testimony), at 63-66.

⁹ Doc. no. 125 (Avocent Huntsville's Summary and Background of the Technology Embodied in the Claims of the Patents-in-Suit), at 5.

original technology was designed so that, even if a digital signal degraded over extended distances,

the digital information could be reliably recovered by comparing the received signal to an intermediate reference point. A “1” would be registered if the received signal was above the reference point; a “0” would be registered if the signal was below that reference point, regardless of line-induced degradation.¹⁰

In the early 1990s, however, IBM introduced an *analog* video standard called Video Graphics Adapter (“VGA”), which presented a new set of challenges. Analog signals can have an infinite number of amplitudes between a minimum and maximum value, and the specific amplitude transmitted by the computer’s CPU *is* the information being conveyed by the signal. Thus, *any degradation* in the signal can cause an uncorrectable loss in information.¹¹ As the computer industry began replacing digital video systems with the new analog VGA systems, Cybex commenced its work on the problems associated with the transmission of analog VGA video over extended distances. Cybex’s efforts in this area ultimately led to the inventions disclosed in the ‘997 and ‘919 patents.¹²

PART TWO

The Disputed Claims

¹⁰ *Id.* at 6.

¹¹ *See id.*

¹² *See id.* at 7-8.

Claim 1 of the '997 patent, and claims 1, 16, and 18 of the '919 patent, are independent claims. Claim 6 of the '919 patent is dependent on claim 1, and claim 17 of the same patent is dependent on claim 16.

A. Claim 1 of the '997 Patent

The claim recites:

1. A system for transmission of analog color video signals between a source of said signals and a video monitor, being at spaced locations, comprising:^[13]

a plurality of computers, each providing, as a set, said color video signals;

a switch receiving said sets of said color video signals, each with respect to a common reference, from said computers and providing a selected said set of said color video signals as an output;

a signal transmitter at a first location responsive to said output of a set of said color video signals, said transmitter, including^[14] an *amplifier* for each said color video signal of one of said sets for providing a color video signal output and wherein^[15] at least a high frequency portion of each said color video signal has been

¹³ The word “comprising” is a term of art in Patent law that means the claim includes all of the elements that follow in the body of the claim statement, but that it does not exclude additional, unrecited elements. *See, e.g., Georgia-Pacific Corp. v. United States Gypsum Co.*, 195 F.3d 1322, 1327-28 (Fed. Cir. 1999). Claims that use “comprising” are sometimes referred to as “open claims.” *See, e.g., Vivid Techs. v. American Science & Eng’g*, 200 F.3d 795, 811 (Fed. Cir. 1999).

¹⁴ The word “including” is another term that, like “comprising,” signals the claim statement encompasses all of the elements that follow, but does not exclude additional, un-recited elements. *See* Robert C. Faber, *LANDIS ON MECHANICS OF PATENT DRAFTING* § 7 (4th ed. 1999).

¹⁵ The word “wherein” is another term of Patent art that customarily signals the claim includes all the elements that follow, but does not necessarily exclude additional, unrecited elements. *See id.*

amplified as a direct function of frequency and providing both an inverting and non-inverting signal, available as an output;

a plurality of video transmission circuits, each said circuit having first and second ends, respectively, one circuit for each of said color video signals of one of said sets and each said circuit having an input responsive to an output of said transmitter at said first end, and each said circuit having a responsive signal output at said second end;

a signal receiver at a second location responsive to each of said transmitted signal outputs and color video signal at said second end, including an *amplifier* for each said color video signal for providing a *discrete* color video signal with respect to a common reference; and

signal means responsive to said receiver for providing each said color signal, each with respect to a common reference, to an analog color video monitor.¹⁶

B. Claim 1 of the '919 Patent

The claim recites:

1. An extended-in-length computer video communications link for transmitting computer video signals comprising:

a source of computer video signals including red, green, and blue video signals,

a video transmitter comprising a plurality of *amplifiers*, one of each said *amplifiers* for each of said red, green, and blue video signals, each said *amplifier* comprising:

¹⁶ '997 patent, Col. 13 line 14 through Col. 14 line 15 (emphasis supplied). A copy of the '997 patent is located, among many other places in the record, at doc. no. 79 (Avocent's Combined Memorandum), Ex. A(2).

a signal input for receiving a one of said red, green and blue video signals,

frequency sensitive compensating circuitry responsive to a said video signal so that said *amplifier* provides a first video signal that increases in amplitude with increasing frequency at a first output and a second video signal that is an inverse of said first video signal at a second output,

a twisted pair of conductors for each said *amplifier*, with first and second conductors of said twisted pair coupled at one end to respective said first and second outputs of said *amplifier*,

an *adapter* for each of said twisted pair of conductors, each said adapter coupled to an opposite end of a respective one of said twisted pair of conductors, each said *adapter* receiving said first video signal and said second video signal and providing a respective said video signal as a single ended output, and further configured to provide a ground reference potential for said transmitter at said adapter, whereby need for a reference ground conductor between said transmitter and said adapter is eliminated.¹⁷

C. *Dependent Claim 6 of the '919 Patent*

This claim, which is dependent on claim 1 above, recites “[a] video communications link as set forth in claim 1 wherein said source of video signals comprises a termination point of another video communications link.”¹⁸

D. *Claim 16 of the '919 Patent*

¹⁷ '919 patent, Col. 18 lines 12-41 (emphasis supplied). The '919 patent is located, among many other places in the record, at doc. no. 79 (Avocent's Combined Memorandum), at Ex. A(1).

¹⁸ *Id.*, Col. 19, lines 5-7.

The claim recites:

16. A computer video signal communications system for selectively coupling sets of R, G, B computer color video signals from one of a plurality of computers to a separately located color monitor, said system comprising:

a transmitter including:

switching means for selectively providing a said set of said color video signals from a selected said computer, and

a first signal format converter responsive to each said color signal of a said set of color signals from said switching means for converting a signal format of each said color signal from single ended format to a balanced format;

a plurality of sets of twisted pair conductors, each set of said conductors having a first end and second end, with a said first end of each of said sets of conductors receiving a *discrete* color video signal from said transmitter;

a receiver coupled to said second ends of said sets of said twisted pair conductors and including:

a plurality of second signal format converters for converting a said balanced format of each said *discrete* color video signal from each said set of conductors from balanced to unbalanced format; and

signal means responsive to unbalanced format signals from said receiver for coupling color video signals to a color video monitor.¹⁹

E. *Dependent Claim 17 of the '919 Patent*

¹⁹ *Id.*, Col. 20 line 48 through Col. 21 line 7 (emphasis supplied).

This claim, which is dependent on claim 16 above, recites “[a] system as set forth in claim **16** wherein said receiver includes frequency compensation means for boosting a frequency response of at least one said color video signal directly as a function of frequency.”²⁰

F. *Claim 18 of the ‘919 Patent*

The claim recites:

18. A computer video signal communications system for selectively coupling a set of R, G, and B computer color video signals from one of a plurality of computers to a separately located color monitor, said system comprising:

a transmitter including:

switching means for selectively providing said set of R, G, and B computer color video signals from a selected said computer, and

a first signal format converter responsive to each said R, G and B color video signal for converting a signal format of each said R, G and B color video signal from single ended format to a balanced format;

a set of twisted pair conductors for each said balanced format R, G, and B color video signals, each said set of twisted pair conductors having a first end and a second end, with a said first end of each of said sets of twisted pair conductors receiving a *discrete* one of said balanced format R, G, and B color video signals from said transmitter;

a receiver coupled to said second ends of said sets of twisted pair

²⁰ *Id.*, Col. 21, lines 8-11.

conductors and including:

frequency compensation means for boosting a frequency response of each said R, G and B color video signal directly as a function of frequency;

a plurality of second signal format converters for converting said balanced format of each said R, G and B color video signal from each said set of twisted pair conductors from balanced to unbalanced format; and

signal means responsive to said [sic] unbalanced format signals from said receiver for coupling said R, G and B color video signals to a color video monitor.²¹

PART THREE

Claim Construction Principles

“It has long been understood that a patent must describe the exact scope of an invention and its manufacture to secure to the patentee all to which he is entitled, and to apprise the public of what is still open to them.” *Markman*, 517 U.S. at 373 (citation, internal quotation marks, and alterations omitted). When a district court is required to interpret the words of a patent, therefore, “intrinsic evidence” of the patent’s scope is preferred over “extrinsic evidence.” Briefly, *intrinsic evidence* consists of records available to the public from the Patent and Trademark Office: *i.e.*, the patent itself (consisting of the patent’s *specification* and the inventor’s *claims*, which are statements of the subject matter that the inventor regards as his invention),

²¹ *Id.*, Col. 21 lines 12-44 (emphasis supplied).

and the *prosecution history* of the patent before the Patent and Trademark Office. *Extrinsic evidence*, on the other hand, consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises. *See, e.g., Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1584 (Fed. Cir. 1996).²² Intrinsic evidence is assigned the position of first importance because it is included in records obtainable from the Patent and Trademark Office, “a record on which the public is entitled to rely” when attempting to ascertain the scope of the patent owner’s invention, and his concomitant right to exclude others from practicing the patented invention. *Bell & Howell Document Management v. Altek Systems*, 132 F.3d 701, 706 (Fed. Cir. 1997) (quoting *Vitronics*, 90 F.3d at 1583). In short, not all sources of interpretative guidance are treated equally, as the following discussion attempts to make clear.

A. *The Inventor’s Claims*

The first paragraph of section 112 of the Patent Act requires an inventor to provide a “specification” describing his invention “in such full, clear, concise, and exact terms as to enable any person skilled in the art . . . to make and use the same.” 35 U.S.C. § 112.²³ The second paragraph of the same section goes on to require that

²² The Federal Circuit’s decision in *Vitronics* notes that “prior art” also may constitute extrinsic evidence. *See* 90 F.3d at 1584-85.

²³ In full text, the first paragraph provides that: “The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full,

the inventor conclude his specification with one or more “claims,” which serve the purpose of “particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.” *Id.*; *see also, e.g., Corning Glass Works v. Sumitomo Electric U.S.A., Inc.*, 868 F.2d 1251, 1257 (Fed. Cir. 1989) (describing an inventor’s claims as defining “the metes and bounds of the right which the patent confers on the patentee to exclude others from making, using or selling the protected invention”). In other words, an inventor is required by the second paragraph of § 112 to define precisely what his invention is. The Supreme Court has said that a claim “defines the scope of a patent grant, and functions to forbid not only exact copies of an invention, but products that go to the heart of an invention but avoids the literal language of the claim by making a noncritical change.” *Markman*, 517 U.S. at 373 (citations, footnote, internal quotation marks, and alteration omitted).

When interpreting the scope of a patent, therefore, district courts are instructed to begin with the words of the inventor’s *claims*, because they are “of primary importance” when attempting “to ascertain precisely what it is that is patented.” *Merrill v. Yeomans*, 94 U.S. 568, 570 (1876); *see also, e.g., Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004) (“It is

clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.” 35 U.S.C. § 112, first paragraph.

a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude.”); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*) (same); *Vitronics*, 90 F.3d at 1582 (observing that the Federal Circuit looks “to the words of the claims . . . to define the scope of the patented invention”).²⁴

1. *Construing claim language*

Words printed on the pages of a patent granted by the Patent and Trademark Office constitute an attempt to objectively communicate an inventor’s subjective, mental processes.²⁵ Yet, words are slippery things,²⁶ and pegging the precise meaning accorded certain terms and phrases in an inventor’s claims can prove a daunting task.

²⁴ The Federal Circuit sometimes has stated that “the claim construction inquiry . . . begins and ends in all cases with the actual words of the claim.” *Renishaw PLC v. Marposs Societa’ Per Azioni*, 158 F.3d 1243, 1248 (Fed. Cir. 1998) (emphasis supplied) (citing, *e.g.*, *Abtox, Inc. v. Exitron Corp.*, 122 F.3d 1019, 1023 (Fed. Cir. 1997) (“[T]he language of the claim frames and ultimately resolves all issues of claim interpretation.”)). Between the alpha and omega of claim construction, however, more than just the words of the claims are consulted, as the discussion in Part Three of this opinion, hopefully, makes clear.

²⁵ Compare Max Radin, *Law as Logic and Experience* 25 (1940) (“Experience cannot really be described in words at all. Words can only suggest and point at experience and make that experience intelligible by using some striking element as a sign or symbol.”), with Benjamin N. Cardozo, *The Nature of the Judicial Process* 13 (1921) (“We may try to see things as objectively as we please. None the less, we can never see them with any eyes except our own.”).

²⁶ See, *e.g.*, Radin, *supra* at 4-5 (“Whether we like it or not, law as experience, as well as law as logic, is bound to be a matter of words to a very considerable degree. We cannot have legal experience without communication and we cannot communicate with each other in dumb show. And if we use words, we had better be careful of them, since the minutest changes carry tremendous implications.”) (emphasis supplied); T.S. Eliot, *Burnt Norton*, lines 149-53 (1935) (observing that, even though printed “words, after speech, reach into the silence,” more often than not they “strain, crack and sometimes break, under the burden, under the tension, slip, slide, perish, decay with imprecision, will not stay in place, will not stay still.”).

There are, of course, many sources that a moment's reflection and common sense would lead one to consult when attempting to discern the meaning ascribed to disputed claim-terms in a particular patent: *e.g.*, the manner in which a word ordinarily is defined and used in the English language; the customary sense in which a term commonly is used by a trade, professional, scientific, or technological group familiar with the art of the patent; the meaning gleaned from reading everything included within the four corners of the patent, and the file containing its prosecution history; or, a special definition clearly assigned to the word by the inventor in the body of his patent or its prosecution history (referred to by Patent lawyers as the inventor "serving as his own lexicographer"). These various sources of meaning are not accorded equal weight, however.

a. *inventor as lexicographer*

If present, one source of interpretative guidance — the patent applicant acting as his own lexicographer — is preeminent, and is alone controlling on the meaning of disputed claim-terms. *See, e.g., K-2 Corp. v. Salomon S.A.*, 191 F.3d 1356, 1363 (Fed. Cir. 1999) (observing that a definition "clearly and deliberately set forth in the intrinsic materials — the written description [*i.e.*, specification] or the prosecution history — will control"); *Renishaw PLC v. Marposs Societa' Per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998) (stating that, when the inventor acts as his own

lexicographer, “the definition selected by the patent applicant controls”).

b. *the presumption of a word’s ordinary or customary meaning*

In the absence of clear evidence that the patent applicant acted as his own lexicographer, district courts are instructed to accord each disputed claim term its “ordinary and customary meaning” — *that is*, the sense in which the word ordinarily or customarily would be used by “a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application.” *Phillips*, 415 F.3d at 1312-13. *See also, e.g., Innova*, 381 F.3d at 1116 (“A court construing a patent claim seeks to accord a claim the meaning it would have to a person of ordinary skill in the art at the time of the invention.”); *Home Diagnostics, Inc. v. LifeScan, Inc.*, 381 F.3d 1352, 1358 (Fed. Cir. 2004) (“customary meaning” refers to the “customary meaning in [the] art field”); *Ferguson Beauregard/Logic Controls v. Mega Sys., LLC*, 350 F.3d 1327, 1338 (Fed. Cir. 2003) (claim terms “are examined through the viewing glass of a person skilled in the art”).²⁷

“That starting point is based on the well-settled understanding that inventors are typically persons skilled in the field of the invention and that *patents are addressed to and intended to be read by others of skill in the pertinent art.*” *Phillips*,

²⁷ *See also, e.g., PC Connector Solutions LLC v. SmartDisk Corp.*, 406 F.3d 1359, 1363 (Fed. Cir. 2005) (meaning of claim “must be interpreted as of [the] effective filing date” of the patent application); *Schering Corp. v. Amgen Inc.*, 222 F.3d 1347, 1353 (Fed. Cir. 2000) (same).

415 F.3d at 1313 (emphasis supplied) (citing *Verve, LLC v. Crane Cams, Inc.*, 311 F.3d 1116, 1119 (Fed. Cir. 2002) (holding that patent documents are meant to be “a concise statement for persons in the field”); *In re Nelson*, 280 F.2d 172, 181 (C.C.P.A. 1960) (“The descriptions in patents are not addressed to the public generally, to lawyers or to judges, but, as section 112 says, to those skilled in the art to which the invention pertains or with which it is most nearly connected.”)).

B. *The Patent’s Specification*

As explained in the beginning of Part Three (Section A) above, the first paragraph of section 112 of the Patent Act requires an inventor to provide a “specification” of his invention — defined in part as a written description of the invention framed in “full, clear, concise, and exact terms” — whereas the second paragraph of the same section goes on to provide that “[t]he *specification shall conclude with one or more claims* particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.” 35 U.S.C. § 112 (emphasis supplied).²⁸

²⁸ The full text of section 112 reads as follows:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Thus, an inventor's "claims" are but the concluding part of his patent's "specification," and the specification consequently can, and often does, provide important interpretative clues to the meanings accorded disputed claim terms by the inventor. *See Phillips*, 415 F.3d at 1315 ("The claims, of course, do not stand alone. Rather, they are part of a fully integrated written instrument, consisting principally of a specification that concludes with the claims. *For that reason, claims must be read in view of the specification, of which they are a part.*") (emphasis supplied) (citation and internal quotation marks omitted).

Further, "[i]n light of the statutory directive that the inventor provide a 'full' and 'exact' description of the claimed invention, the specification necessarily informs

A claim may be written in independent or, if the nature of the case admits, in dependent or multiple dependent form.

Subject to the following paragraph, a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

A claim in multiple dependent form shall contain a reference, in the alternative only, to more than one claim previously set forth and then specify a further limitation of the subject matter claimed. A multiple dependent claim shall not serve as a basis for any other multiple dependent claim. A multiple dependent claim shall be construed to incorporate by reference all the limitations of the particular claim in relation to which it is being considered.

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

35 U.S.C. § 112.

the proper construction of the claims.” *Id.* at 1316; *see also id.* (“The importance of the specification in claim construction derives from its statutory role. The close kinship between the written description and the claims is enforced by the statutory requirement that the specification describe the claimed invention in ‘full, clear, concise, and exact terms.’” (quoting 35 U.S.C. § 112, para. 1)) (other citations omitted).

As a consequence, the Federal Circuit has held that a patent’s specification “is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.” *Vitronics*, 90 F.3d at 1582; *see also Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 452 (Fed. Cir. 1985) (“The descriptive part of the specification aids in ascertaining the scope and meaning of the claims inasmuch as the words of the claims must be based on the description. The specification is, thus, the primary basis for construing the claims.”); *In re Fout*, 675 F.2d 297, 300 (CCPA 1982) (“Claims must always be read in light of the specification. Here, the specification makes plain what the appellants did and did not invent.”).

“The construction that stays true to the claim language and most naturally aligns with the patent’s description of the invention [*i.e.*, “specification”] will be, in the end, the correct construction.” *Renishaw*, 158 F.3d at 1250.

Consistent with that general principle, [the Federal Circuit’s] cases recognize that the specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor’s lexicography governs. *See CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002). In other cases, the specification may reveal an intentional disclaimer, or disavowal, of claim scope by the inventor. In that instance as well, the inventor has dictated the correct claim scope, and the inventor’s intention, as expressed in the specification, is regarded as dispositive. *See SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1343-44 (Fed. Cir. 2001).

The pertinence of the specification to claim construction is reinforced by the manner in which a patent is issued. The Patent and Trademark Office (“PTO”) determines the scope of claims in patent applications not solely on the basis of the claim language, but upon giving claims their broadest reasonable construction “in light of the specification as it would be interpreted by one of ordinary skill in the art.” *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). Indeed, the rules of the PTO require that application claims must “conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description.” 37 C.F.R. § 1.75(d)(1). It is therefore entirely appropriate for a court, when conducting claim construction, to rely heavily on the written description for guidance as to the meaning of the claims.

Phillips, 415 F.3d at 1316-17.

1. *The patent’s specification does not limit the inventor’s claim*

The Federal Circuit has often said that “claims must be read in view of the specification, of which they are a part.” *Id.* at 1315. Even so, the Supreme Court has long held that a specification cannot be used to limit the claim — that is, for the

purpose of changing the claim, “and making it different from what it is”:

Some persons seem to suppose that a claim in a patent is like a nose of wax, which may be turned and twisted in any direction, by merely referring to the specification, so as to make it include something more than, or something different from, what its words express. The context [*i.e.*, specification] may, undoubtedly, be resorted to, and often is resorted to, for the purpose of better understanding the meaning of the claim; *but not for the purpose of changing it, and making it different from what it is.* The claim is a statutory requirement, prescribed for the very purpose of making the patentee define precisely what his invention is; and it is unjust to the public, as well as an evasion of the law, to construe it in a manner different from the plain import of its terms. ...

White v. Dunbar, 119 U.S. 47, 51-52 (1886) (emphasis supplied).

Yet, this presents a perplexing problem for district court judges: exactly how does one practically go about the business of applying the seemingly-contradictory axioms that “(a) a claim must be read in view of the specification [*but*] (b) a court may not read a limitation into a claim from the specification”? *Innova*, 381 F.3d at 1117 (citing *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 904-05 (Fed. Cir. 2004) (acknowledging the “fine line” and “inherent tension” attending the question presented by these two axioms)). As best this court understands the Federal Circuit’s teachings on the resolution of this conundrum, they are as follows. First, even though a patent’s specification often describes specific embodiments of the invention, the Federal Circuit has warned district courts against “confining the claims to those embodiments.” *Phillips*, 415 F.3d at 1323 (citing, *e.g.*, *Nazomi Communications, Inc.*

v. ARM Holdings, PLC, 403 F.3d 1364, 1369 (Fed. Cir. 2005) (claims may embrace “different subject matter than is illustrated in the specific embodiments in the specification”)); *see also, e.g., Innova*, 381 F.3d at 1117 (“[P]articular embodiments appearing in the written description will not be used to limit claim language that has broader effect.”) (citations omitted).

Second, if a patent describes only a single embodiment of the invention, the claims should not be construed as

limited to that embodiment. That is not just because section 112 of the Patent Act requires that the claims themselves set forth the limits of the patent grant, but also because persons of ordinary skill in the art rarely would confine their definitions of terms to the exact representations depicted in the embodiment.

Phillips, 415 F.3d at 1323 (citation omitted); *see also, e.g., Innova*, 381 F.3d at 1117 (“[E]ven where a patent describes only a single embodiment, claims will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction.”) (citations and internal quotation marks omitted).

C. *The Prosecution History*

The prosecution history of a patent consists of the complete record of proceedings before the Patent and Trademark Office, “including any express representations made by the applicant regarding the scope of the claims.” *Vitronics*,

90 F.3d at 1582. That history, when it is in evidence, also should be consulted for purposes of construing disputed claim terms because, “[l]ike the specification, the prosecution history provides evidence of how the PTO and inventor understood the patent.” *Lemelson v. General Mills, Inc.*, 968 F.2d 1202, 1206 (Fed. Cir. 1992).

Furthermore, like the specification, the prosecution history was created by the patentee in attempting to explain and obtain the patent. Yet because the prosecution history represents an ongoing negotiation between the PTO and the applicant, rather than the final product of that negotiation, it often lacks the clarity of the specification and thus is less useful for claim construction purposes.

Phillips, 415 F.3d at 1317 (citations omitted); *see also, e.g., Multifarm Desiccants, Inc. v. Medzam, Ltd.*, 133 F.3d 1473, 1478 (Fed. Cir. 1998) (“The best source for understanding a technical term is the specification from which it arose, informed, as needed, by the prosecution history.”).

D. Extrinsic Evidence

Although a district court should limit its analysis of disputed claim terms to intrinsic evidence, if it is possible to do so, when — and only when — such evidence is not sufficient for determining the acquired meaning, extrinsic evidence may be consulted for that purpose. *See, e.g., Interactive Gift Express, Inc. v. Compuserve, Inc.*, 231 F.3d 859, 866 (Fed. Cir. 2000) (“Relying on extrinsic evidence to construe a claim is ‘proper only when the claim language remains genuinely ambiguous after consideration of the intrinsic evidence.’”) (quoting *Bell & Howell*, 132 F.3d at 706).

For example, technical dictionaries and treatises may assist a court to better understand the underlying technology, and to comprehend the way in which a person skilled in the art might use the claim terms. *See Phillips*, 415 F.3d at 1318.

Expert testimony also “can be useful to a court for a variety of purposes, such as to provide background on the technology at issue, to explain how an invention works, to ensure that the court’s understanding of the technical aspects of the patent is consistent with that of a person of skill in the art, or to establish that a particular term in the patent or prior art has a particular meaning in the pertinent field.” *Id.* (citations omitted).

The Federal Circuit has emphasized, however, that extrinsic evidence is generally less reliable and less significant than intrinsic evidence in determining the meaning of claim terms. *See id.* at 1318-19. Accordingly, extrinsic evidence “may not be used to vary or contradict the claim language,” or to “contradict the import of other parts of the specification.” *Vitronics*, 90 F. 3d at 1584. In exercising their discretion to admit and use extrinsic evidence, therefore, district courts must ensure that such evidence is considered in the context of the intrinsic evidence. *See Phillips*, 415 F.3d at 1319.

PART FOUR

Construction of Disputed Claim Terms

A. “*Twisted Pair*” — ‘919 patent²⁹

As the phrase suggests, “twisted pair” wiring generally refers to a pair of electrically insulated wires entwined in a spiral pattern.³⁰ The parties agree that such conductors may be either “unshielded” or “shielded,” with shielded wiring having an extra protective sheath wrapped around the insulated pair to minimize electromagnetic interference.³¹ In the asserted claims of the ‘919 patent, “twisted pair” conductors are used to achieve the transmission of analog video signals over extended distances. In the Joint Claim Construction and Pre-Hearing Statement, ClearCube asserted that the ‘919 patent clearly and unambiguously limited the term “twisted pair” to mean *unshielded* “twisted pair.”³² Nevertheless, ClearCube conceded its position at the claim construction hearing, stipulating that the term “twisted pair” as claimed in the ‘919 patent can be either shielded or unshielded.³³

B. “*Amplifier*” — ‘997 and ‘919 patents

Claim 1 of the ‘997 patent, and claim 1 of the ‘919 patent, both require “amplifiers” to assist in the transmission of analog color video signals. The parties’

²⁹ There is no reference to “twisted pair” wiring in the ‘997 patent.

³⁰ Doc. no. 79 (Avocent’s Combined Memorandum), Ex. A(9), *Modern Dictionary of Electronics* 810 (7th ed. 1999).

³¹ See *id.*, Ex. A(10), *Microsoft Computer Dictionary* 533 (5th ed. 2002); *id.*, Ex. A(11), *Penguin Dictionary of Electronics* 401 (3d ed. 1998).

³² See doc. no. 78 (Joint Claim Construction and Pre-Hearing Statement), at 14, 17.

³³ See Transcript of *Markman* Hearing, Vol. II (February 23, 2006 testimony), at 77.

original constructions of “amplifier,” as asserted in the Joint Claim Construction and Pre-Hearing Statement, diverged widely.³⁴ In an effort to forge some consensus, this court proposed the following, preliminary construction of the term “amplifier” during the claim construction hearing: “an amplifier is a circuit (or a device when connected in a circuit) that draws power from a source other than the input signal and provides an output signal that reproduces the essential features of the input signal *with either increased voltage or increased current*.”³⁵ ClearCube agrees that the court’s definition of “amplifier” is appropriate.³⁶ Avocent, on the other hand, objects to inclusion of the ending qualification “with either increased voltage or increased current”; but, otherwise, it also agrees with the court’s construction.³⁷ Thus, the court finds that the parties’ contentions have been narrowed to the following issue: must an “amplifier” provide an output signal that reproduces the essential features of the input signal *with either increased voltage or increased current*?

1. *Origins of the phrase “with either increased voltage or increased current”*

A resolution of this issue requires a brief explanation of how the phrase “with

³⁴ See doc. no. 78 (Joint Claim Construction and Pre-Hearing Statement), at 7 (Avocent’s construction) and 9-13 (ClearCube’s construction).

³⁵ Transcript of *Markman* Hearing, Vol. II (Feb. 23, 2006 testimony), at 91 (emphasis supplied).

³⁶ See *id.* at 178-79.

³⁷ See *id.* at 168-71, 174.

either increased voltage or increased current” came to be included in the court’s preliminary construction. The court’s original understanding of “amplifier” was based, in large part, upon its everyday experience. The court understood that amplifiers were designed to *enlarge* the essential features of a signal.³⁸ Indeed, the verb “amplify” may commonly be defined to mean “to enlarge, expand, or extend.” *Webster’s Third New International Dictionary of the English Language Unabridged* 74 (2002).

This understanding of “amplifier” also was consistent with a preferred embodiment of the invention, represented in Figure 1 of the ‘997 patent and Figure 1 of the ‘919 patent. The related written description specifies that the “amplifier” has a signal input and a signal output. Importantly, the voltage of the signal at the output (represented as V_O) is described as being greater than the voltage of the signal at the input (represented as V_I).³⁹ In other words, there is a voltage *increase* at the amplifier’s output.

The term “current” was added to the court’s vocabulary when Joseph C. McAlexander, an expert witness retained by Avocent, introduced the concept at the

³⁸ See, e.g., doc. no. 79 (Avocent’s Combined Memorandum), Ex. A(9), *Modern Dictionary of Electronics*, 22 (7th ed 1999) (defining an “amplifier” as “[a] device that draws power from a source other than the input signal and that produces as an output an *enlarged* reproduction of the essential features of its input.”) (emphasis supplied).

³⁹ See, e.g., ‘997 patent, Col. 5, lines 15-30; ‘919 patent, Col. 5, lines 20-34.

claim construction hearing. Mr. McAlexander explained that *voltage* and *current* are distinct, but interrelated concepts: if signal transmission were to be analogized to the reservoir of water impounded by a dam, the term “current” would correspond to the movement of water released through the dam’s sluice gates, and “voltage” would describe the kinetic force of that current.⁴⁰

Armed with these concepts, the court proffered its construction that an amplifier must reproduce the essential features of an input signal “with either increased voltage or increased current.” Importantly, however, this preliminary construction was proffered *before* the close of expert witness testimony.

2. “Amplifiers” in the electrical arts

Gregg L. Vaughn, Ph.D., P.E., was retained by ClearCube to offer opinion testimony at the claim construction hearing. Dr. Vaughn testified that, while an “amplifier” in the electrical arts can increase either the voltage or current of a signal, it also can *maintain* voltage or current, or even *decrease* current or voltage.⁴¹ This was the state of the technology in 1994, when the applications for the ‘919 and ‘997 patent were filed, and long before then.⁴² In light of this testimony, the court engaged Dr. Vaughn in the following discussion:

⁴⁰ See Transcript of *Markman* Hearing, Vol. I (February 22, 2006 testimony), at 120-22.

⁴¹ See Transcript of *Markman* hearing, Vol. II (February 23, 2006 testimony) at 141-42.

⁴² See *id.* at 142.

THE COURT: Why do you call it an amplifier, then, if it's not amplifying?

THE WITNESS: It's just the term that's used.

THE COURT: But it's not amplifying in the sense that —

THE WITNESS: It is, in fact, not increasing the voltage amplitude. However, it's what the industry calls that device⁴³

The court also was directed to a portion of the specification of the '919 patent, which expressly provides that an embodiment of the "amplifier" can *condition* a video signal so as to *decrease* its voltage.⁴⁴

Upon review of Dr. Vaughn's testimony, and the embodiment of the "amplifier" disclosed in the '919 patent, the court concludes that Avocent's argument on this issue is persuasive. An "amplifier" is a "circuit (or a device when connected in a circuit) that draws power from a source other than the input signal and provides an output signal that reproduces the essential features of the input signal." In other words, there is no requirement that the "amplifier" reproduce the essential features of the input signal "with either increased voltage or increased current." *See Phillips*, 415 F.3d at 1318 (holding that a court may rely upon expert witness testimony to ensure that its understanding of the technology at issue is consistent with that of a person skilled in the relevant art).

⁴³ *Id.* at 143.

⁴⁴ *See* '919 patent, Col. 7, lines 5-13.

C. *“Discrete” — ‘997 and ‘919 patent*

The term “discrete” is recited in claim 1 of the ‘997 patent, as well as in claims 16 and 18 of the ‘919 patent. The parties agree that “discrete” is not a technical term unique to the electrical arts. Indeed, it is undisputed that “discrete” may simply mean “separate” or “distinct.” Even so, inherent in this common understanding of “discrete” is the notion that one thing, whatever that thing may be, is separate or distinct from something else. The challenge in this case is to determine, with precision, the objects that are meant to be separate or distinct from others.

1. *Claim language*

Claim 1 of the ‘997 patent and claims 16 and 18 of the ‘919 patent all address the problem of transmitting analog color video signals over extended distances. It is undisputed that color video signals are transmitted in three primary colors — red, green, and blue — which are mixed at the monitor to produce all the hues of a color palate.

Claim 1 of the ‘997 patent describes “[a] system for transmission of analog color video signals between a source of said signals and a video monitor.”⁴⁵ There are several elements in this system, including a “signal receiver.” Importantly, the receiver itself includes “an amplifier for each said color video signal for providing a

⁴⁵ ‘997 patent, Col. 13, lines 14-15.

discrete color video signal with respect to a common reference.”⁴⁶ In the context of this claim, the court has little trouble concluding that the word “discrete” modifies the phrase “color video signal.” The plain language of the claim requires an amplifier to provide a color video signal (*e.g.*, red) that is separate or distinct *from the other two color video signals* (*e.g.*, green and blue).

Claim 16 of the ‘919 patent requires a similar analysis. This claim involves a system for “selectively coupling sets of R, G, B computer color video signals from one of a plurality of computers to a separately located color monitor.”⁴⁷ Claim 16 requires that, at one end of this system, there be a “transmitter” that processes the color video signals. Further along the system, there is

a plurality of sets of twisted pair conductors, each set of said conductors having a first end and second end, with a said first end of each of said sets of conductors receiving a *discrete* color video signal from said transmitter[.]⁴⁸

In the context of this claim, the court again finds that the word “discrete” modifies the phrase “color video signal.” The plain language of the claim requires that a twisted pair conductor receive, from the transmitter, a color video signal that is separate or distinct *from the other two color video signals*.

Claim 18 of the ‘919 patent, like claim 16, also calls for the transmission of a

⁴⁶ *Id.*, Col. 14, lines 9-11.

⁴⁷ ‘919 patent, Col. 20, lines 48-50.

⁴⁸ *Id.*, Col. 20, lines 61-65.

set of red, green, and blue color video signals from *one* of a plurality of computers to a color monitor located at an extended distance from the selected computer.⁴⁹ Claim 18 requires that, within this system, there be a “transmitter” that processes the color video signals so that the signals are converted from a “single ended format” to a “balanced format.”⁵⁰ Further along the transmission line, there is

a set of twisted pair conductors for each said balanced format R, G, and B color video signals, each said set of twisted pair conductors having a first end and a second end, with a said first end of each of said sets of twisted pair conductors receiving a *discrete one* of said balanced format R, G, and B color video signals from said transmitter[.]⁵¹

Here, the court finds that the words “discrete one” modify the phrase “R, G, and B color video signals from said transmitter”; in other words, the “front end” of each of the sets of twisted pair conductors *receives a single* color video signal (*e.g.*, red) that is separate or distinct *from the other two color video signals (e.g., green and blue)*.

This court is mindful of the fact that claim 18 juxtaposes the adjective “discrete” with the word “one,” distinguishing the resulting phrase from both claim 1 of the ‘997 patent and claim 16 of the ‘919 patent. ClearCube attempts to make much of this point, arguing that the words “discrete” and “one” are redundant. The court declines to belabor this point, for even if there is redundancy, that semantical

⁴⁹ *See id.*, Col. 21, lines 12-15.

⁵⁰ *Id.*, Col. 21, lines 22-23.

⁵¹ *Id.*, Col. 21, lines 24-30.

observation alone would not support the construction of “discrete” proffered by ClearCube.

2. *Specification*

ClearCube also argues that the use of the term “discrete” in the disputed claims means that each color video signal must not only be separate or distinct from the other color signals in transmission, but the discrete color video signals must also be separate or distinct from *horizontal and vertical synchronization signals*.

The parties agree that red, green, and blue color signals, as well as both horizontal and vertical synchronization signals, are necessary for the purpose of creating images on the screen of a color monitor. As the names suggest, the primary red, green, and blue signals supply the colors necessary to produce the resultant image, while horizontal and vertical synchronization signals are necessary, in simplified terms, to frame stable images on the screen. As ClearCube explained:

For those of us that experienced the older television sets before the advent of auto-sync stabilization circuits, an analog video signal “rolled” in the vertical or horizontal direction when the vertical or horizontal sync was out of adjustment. In other words, you could see the image roll across the screen [W]ithout horizontal and vertical sync signals we would experience a constant rolling of the video and therefore would never have a satisfactory image on the monitor or screen.⁵²

It is undisputed that color and synchronization signals may be transmitted in

⁵² Doc. no. 126 (ClearCube’s Summary of Technology), at 6-7.

one of several ways, so that, depending upon the configuration of the circuitry, the signals are sent over one, three, four, or five conductors. For example, all of the signals may be combined in transmission, resulting in what is called a “composite video” signal. This configuration requires the use of only one conductor.⁵³ In another configuration, the red, green, and blue color video signals are transmitted separately, each along its own conductor, and the horizontal and vertical synchronization signals are combined and typically transmitted with the green signals. This requires the use of three conductors.⁵⁴ In a four conductor configuration, red, green, and blue color video signals are transmitted separately, each along its own conductor, and the horizontal and vertical synchronization signals are combined and transmitted on a fourth conductor.⁵⁵ In a five conductor configuration, all of the signals are separated and transmitted along respective conductors.⁵⁶

Unlike the asserted claims, Figure 7 of the ‘997 patent, and the related written description, addresses the transmission of color video *and* synchronization signals. In Figure 7, “HS” represents horizontal synchronization signals, “VS” represents vertical synchronization signals, and “R,” “G,” and “B” represent red, green, and blue color video signals, respectively:

⁵³ See Transcript of *Markman* Hearing, Vol. II (Feb. 23, 2006 testimony), at 111-12.

⁵⁴ See *id.* at 113.

⁵⁵ See *id.*

⁵⁶ See *id.*

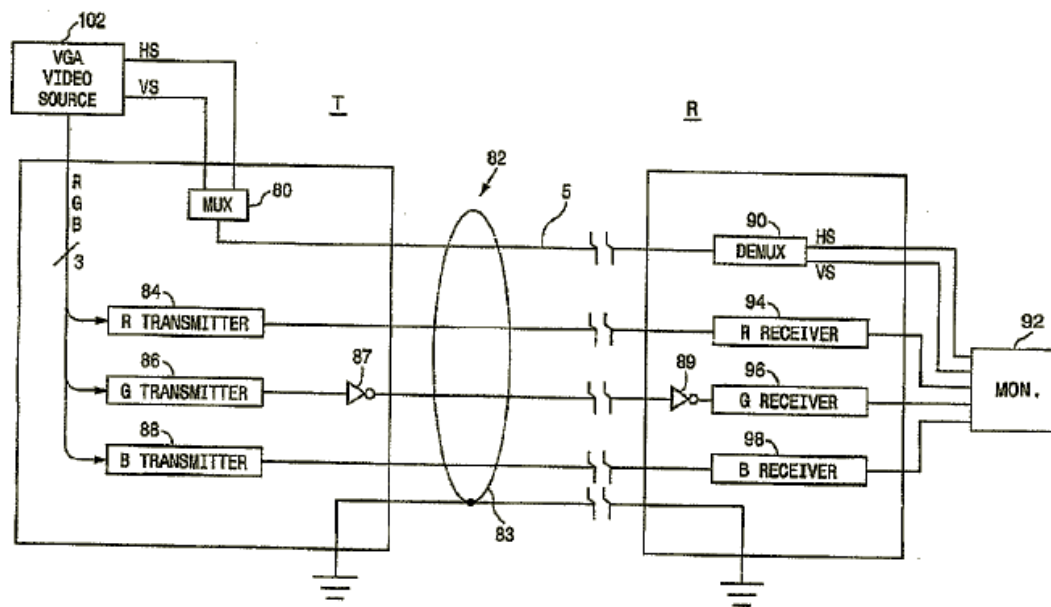


Fig. 7

This embodiment clearly shows that the video signals are separated by color, and that the color signals are separated from the horizontal and vertical synchronization signals transmitted over a fourth conductor.

Even so, a closer examination of Figure 7, and the related written description, shows that the separation of *color video signals* is the focus of this embodiment. In the “Brief Description of the Drawings” portion of the specification, the patentees specify that Figure 7 “is a block diagram showing the relationship of three of the systems shown in Fig. 6.”⁵⁷ The reference back to Figure 6 is important, because that drawing, and the related written description, addresses the transmission of *color video*

⁵⁷ ‘997 patent, Col. 2, lines 33-35.

signals only. Thus, in context, Figure 7 concentrates on the relationship between color video signals in transmission; stated differently, the focus is not on the relationship between color video signals and synchronization signals.

This observation becomes clearer in the “Detailed Description of the Drawings” portion of the specification. There, the patentees explain that a particular problem may arise in the transmission of “multi-color signals” over extended distances.⁵⁸ Specifically, “some unwanted cross-coupling of signals” may occur, “causing distortions appearing on the visual output of the monitor.”⁵⁹ The patentees further explain that one feature of their invention is to reduce this problem, with a solution being illustrated in Figures 7 through 10.⁶⁰ Figure 10, like Figure 7, shows the separation of video signals by color. In the patentees’ words, “it is to be noted that R, G, and B transmitters, each following the circuits of [an amplifier illustrated in] Fig. 1, receive *discrete color signals* from a VGA source, and the outputs appearing on output resistors 33.”⁶¹ In this context, Figure 7, which is at issue here, is described as illustrating “a complete system employing transmitters 84, 86, and 88 and receivers 90, 94, and 96.”⁶² It is to be noted that transmitter 84 and receiver 94

⁵⁸ *Id.*, Col. 11, lines 60-63.

⁵⁹ *Id.*, Col. 11, lines 64-66.

⁶⁰ *See id.*, Col. 11, line 66 to Col. 12, line 2.

⁶¹ *Id.*, Col. 12, lines 2-5 (emphasis supplied).

⁶² *Id.*, Col. 12, lines 12-13.

are related to the transmission and receipt of *red* signals, transmitter 86 and receiver 96 are related to the transmission and receipt of *green* signals, and transmitter 88 and receiver 98 are related to the transmission and receipt of *blue* signals.

The written description does go on to note that, in Figure 7, the color video signals are also separated from the horizontal and vertical synchronization signals.⁶³ The description does not, however, place any particular emphasis on the need for, or benefit of, separating color video signals from horizontal and vertical synchronization signals.

Turning next to the specification of the '919 patent, the court finds that Figures 10 and 11 are relevant.⁶⁴ Here, the patentees address the situation where it is necessary to transmit analog color video signals from a single source, over a relatively great distance (on the order of 1,000 to 2,000 feet), to a number of monitors stationed at separate locations. An example of this is seen in airport terminals, where information relating to incoming and outgoing flights must be transmitted from a central source to monitors located at different gates.⁶⁵ An embodiment of the invention is illustrated in Figure 10, and Figure 11 shows a detailed schematic of one

⁶³ See *id.*, Col. 12, lines 22-30.

⁶⁴ Figure 6 of the '919 patent and the drawing beneath the Abstract of the '919 patent also are relevant. However, it is important to note that these drawings are reproductions of Figure 7 of the '997 patent, discussed above in the text.

⁶⁵ See '919 patent, Col. 13, lines 4-10.

portion of the embodiment shown in Figure 10. Therefore, the two drawings are closely related.

Figures 10 and 11 clearly show that video signals are separated by color in transmission and, additionally, the color signals are separated from horizontal and vertical synchronization signals. These drawings lend additional support to ClearCube's construction; but, again, turning to the related written description, the court could not discern any particular emphasis being placed on the separation of color video signals from synchronization signals.

The court finds that ClearCube's claim construction contention, while it is supported by some of the schematic diagrams in the specification, cannot prevail on that basis alone. *See Innova*, 381 F.3d at 1117 (“[E]ven where a patent describes only a single embodiment, claims will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction.”); *see also Phillips*, 415 F.3d at 1323 (“In particular, we have expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment.”).

3. *Prosecution history of the ‘919 patent*

In an Amendment filed by the patentees during the prosecution of the ‘919

patent application, Mark Clodfelter (the patent applicants' agent of record) distinguished a prior art reference ("Chou"⁶⁶) from dependent claim 2 of the '919 patent. Clodfelter represented to the Patent and Trademark Office that:

Dependent claim 2, as amended to correct antecedents with respect to amended claim 1, includes all the limitations of claim 1, and provides the additional limitation that the computer analog video signal further comprises "horizontal sync signals and vertical sync signals, said horizontal sync signals and vertical sync signals applied to respective conductors of twisted pair of conductors." As the system of Chou teaches transmission of composite video over one conductor of a single twisted pair of conductors, there would be no need or motivation to provide horizontal sync and vertical sync signals over other conductors, as claimed by Applicants.⁶⁷

ClearCube reasons, in three steps, that this snippet from the prosecution history supports its construction of the disputed claim term "discrete." First, ClearCube observes that the Chou reference called for the transmission of "composite video": *that is*, combining all video and synchronization signals in transmission "over one conductor of a single twisted pair of conductors." Second, and in order to avoid reading on the Chou reference, Clodfelter distinguished dependent claim 2 of the '919 patent on the basis that it required the separation of vertical and horizontal synchronization signals from color video signals. Finally, ClearCube concludes that

⁶⁶ See United States Patent No. 4,054,910, issued on Oct. 18, 1977; *see also* doc. no. 84 (ClearCube's Response and Memorandum), Ex. 9. The inventors were Wayne W. Chou and Richard Erett. In simplified terms, the invention disclosed a communications system for the transmission of closed circuit television pictures over an ordinary pair of wires.

⁶⁷ *Id.*, Ex. 11, Amendment, at A 889 (underscored emphasis in original).

the asserted, independent claims at issue here — claim 1 of the ‘997 patent, and claims 16 and 18 of the ‘919 patent — also require the separation of synchronization signals from color video signals.

This court is not persuaded by ClearCube’s argument. Claim 2 *expressly* requires that color video signals be transmitted separately from horizontal and vertical synchronization signals. The fact that Clodfelter distinguished claim 2 on the basis of this feature may limit the scope of claim 2. However, that does not mean that the claims at issue here, which say nothing at all about the transmission of synchronization signals, can be limited on the same basis. *See, e.g., Callicrate v. Wadsworth Manufacturing, Inc.*, 427 F.3d 1361, 1371 (Fed. Cir. 2005) (holding that the district court properly rejected a claim construction contention based upon an amendment to the claims made during prosecution, where the claims underlying the amendment were unrelated to the claims at issue).

The patentees filed an additional Amendment during the prosecution of the ‘919 patent application. There, the applicants distinguished claim 16 of the ‘919 patent from a prior art reference (“Gunnarsson”⁶⁸). The following passage of the Amendment is now the focal point of ClearCube’s argument:

⁶⁸ *See* United States Patent No. 5,283,789, issued on Feb. 1, 1994; *see also* doc. no. 84 (ClearCube’s Response and Memorandum), Ex. 10. The inventors were Gunnar Gunnarsson and Gregory Burch. In simplified terms, the ‘789 patent involved a system for providing data and television signals to computer work stations.

The Examiner further states that, with respect to Gunnarsson, “it is inherent that television signals comprise R, G and B color video signals.” However, this is another mistaken statement on the part of the Examiner. Color information in composite video consists of luminance and chroma signals which are phased encoded on a single 3.57 MHz subcarrier frequency in a composite video signal that itself is of a bandwidth of only about 6 MHz. In contrast, each of the R, G and B computer color video signals of Applicants system are discrete, separate video signals that each has an extremely wide bandwidth of from 0 up to about 225 MHz or so.⁶⁹

ClearCube’s contention focuses on the words “discrete” and “separate” as they are used in the phrase “each of the R, G and B computer color video signals of Applicants system are discrete, separate video signals.” ClearCube asserts that “separate” would have been enough to require the separation of color video signals and, accordingly, the word “discrete” must have an additional meaning. Not surprisingly, according to ClearCube, “discrete” means that color video signals are to be separated from synchronization signals.

The court again finds ClearCube’s argument to be unpersuasive. It is possible that the patent applicants intended to give the words “discrete” and “separate” the meaning now endorsed by ClearCube’s counsel. Even so, reading the Amendment in context, it is equally likely that the patent applicants juxtaposed the words in order to emphasize that each of the red, green, and blue video signals are to be separated

⁶⁹ *Id.*, Ex. 12, Amendment, at A 928 (underscored emphasis in original). In the Amendment, the claim at issue was referred to as “claim 20.” Claim 20 was renumbered as claim 16 before the ‘919 patent was published.

from one another. ClearCube does not cite, and the court could not locate, any decision from the Federal Circuit where all words in a prosecution Amendment were presumed to have different meanings. *But see Innova*, 381 F.3d at 1119 (“While not an absolute rule, all *claim terms* are presumed to have meaning in a claim.”) (emphasis supplied).

In sum, the court finds that claim 1 of the ‘997 patent, as well as claims 16 and 18 of the ‘919 patent, only require that each color video signal be separate or distinct from the other two color signals. The specifications of both patents lend some support to ClearCube’s interpretation of “discrete”; but, ultimately, the court finds that ClearCube’s construction, if adopted, would improperly limit the claims to the particular embodiments disclosed in the specification.

D. “Adapter”

Claim 1 of the ‘919 patent addresses the transmission of analog video signals over extended distances, and the “adapter” component, as described in the claim, is located near the end of the system. The parties’ claim construction contentions regarding “adapter” defy easy summation. The arguments must be slowly brought into focus, by first identifying the areas where there is either no dispute, or agreement, between the parties.

Claim 1 of the ‘919 patent describes a source of computer video signals that

provides red, green, and blue color signals to a transmitter. The transmitter itself is comprised of a plurality of amplifiers. Each amplifier, after receiving a color video signal at an input, provides the signal at *two* outputs. Importantly, the signal at the first output is produced in inverse proportion to the signal produced at the second output. These inverse signals are then transmitted over twisted pair conductors, which may span an extended distance. It is undisputed that an “*adapter*” is located at the opposite end of the twisted pair conductors, and there, it *receives* the inverse signals.

It also is undisputed that claim 1 of the ‘919 patent describes the transmission of analog video signals. The amplitude (*i.e.*, the vital information) of an analog signal can be measured in volts, and a baseline for measurement is 0 volts, or “*ground*.” In some electrical systems, ground information is transmitted from one component to another by use of an additional conductor. The ground conductor is “fairly hefty,” compared to the conductors used for transmission of video signal information.⁷⁰

Here, the construction of the term “adapter” brings together, in one element, the dual concepts of (i) receiving analog signals and (ii) ascertaining ground.

1. Claim language

As noted above, a transmitter is located at one end of twisted pair conductors.

⁷⁰ Transcript of *Markman* Hearing, Vol. I (Feb. 22, 2006 testimony), at 138.

The transmitter includes a plurality of amplifiers, and each amplifier provides a first video signal and a second video signal, each signal produced in inverse proportion to the other. An “adapter” is located at the opposite end of the conductors, with

each said adapter receiving said first video signal and said second video signal and providing a respective said video signal as a single ended output, and further *configured to provide a ground reference potential for said transmitter at said adapter, whereby need for a reference ground conductor between said transmitter and said adapter is eliminated.*⁷¹

With regard to these limitations on the term “adapter,” the phrase “for said transmitter,” in the context of the phrase “configured to provide a ground reference potential *for said transmitter* at said adapter,” is at the heart of the parties’ dispute.

ClearCube asserts that “for said transmitter” should be interpreted to mean “from the signals received from the transmitter,” or a close equivalent. Thus, in context, ClearCube’s claim construction contention is that a transmitter (comprised of a plurality of amplifiers) is located on one end of one twisted pair of conductors, and an adapter is located at the other end of the conductors, with

each said adapter receiving said first video signal and said second video signal and providing a respective said video signal as a single ended output, and further configured to provide a ground reference potential [from the signals received from the transmitter] at said adapter, whereby need for a reference ground conductor between said transmitter and said adapter is eliminated.⁷²

⁷¹ ‘919 patent, Col. 18, lines 34-41 (emphasis supplied).

⁷² *Id.*

ClearCube does not contend that its interpretation may be supported on the basis of the claim language alone. Indeed, the court finds that the underpinnings of ClearCube's construction can be fully understood only upon review of the specification.

2. *Specification*

Figure 10 of the '919 patent illustrates the transmission of video signals from a single source to a monitor. Figure 11 shows a detailed schematic of one portion of the embodiment shown in Figure 10 and, therefore, the two drawings are closely related. The written description related to Figures 10 and 11 squarely addresses the use of the component identified as an "adapter." A transmitter is described as having a plurality of amplifiers, with each amplifier providing video signals at two outputs.⁷³ A video signal at one output of the amplifier is provided in "positive polarity," while the video signal at the second output is "inverted to an opposite polarity."⁷⁴ The inverse signal also is "balanced about the signal ground reference potential of about 0 volts DC"⁷⁵ — *i.e.*, "ground." The inverse signal is then received by the adapter, which is located further down the transmission system.⁷⁶

⁷³ See *id.*, Col. 13, lines 26-29, 37-43.

⁷⁴ *Id.*, Col. 13, lines 41-43.

⁷⁵ *Id.*, Col. 17, lines 27-28.

⁷⁶ See *id.*, Col. 17, lines 26-29. The "adapter" is called a "converter" in the written description.

Importantly, at the adapter, the positive side of the inverse signal is sent to the monitor to create a resultant image. *The ground reference point is determined by identifying the center (0 volt) point between the positive and negative sides of the inverse signals.* As stated in the written description,

the positive side of the differential video signal is applied across 75 ohm load resistor 312 in the monitor to develop the video signal. The negative side of the differential video signal is coupled to the video return terminal of the monitor via resistor 310. *Thus, the center point (0 VDC) of the differential signal is referenced to the video return in the monitor, thus eliminating the need for a separate ground connection between the transmitter and the receiver and monitor.*⁷⁷

Avocent concedes that ClearCube's construction of "adapter" naturally aligns with this embodiment of the invention.

3. *Interpreting the claim in view of the specification*

On the basis of the foregoing, the court finds that ClearCube's contention implicates the two canons of claim construction that animate the relationship between the claims and specification: "(a) a claim must be read in view of the specification, [but] (b) a court may not read a limitation into a claim from the specification." *Innova*, 381 F.3d at 117 (citation omitted).

While this is a close question, the court finds that ClearCube's interpretation is ultimately persuasive. Avocent concedes that ClearCube's construction is

⁷⁷ *Id.*, col. 17, lines 43-55 (emphasis supplied).

consistent with the specification. More importantly, the court finds that ClearCube's interpretation also is consistent with the claim language as a whole. Indeed, ClearCube's interpretation illuminates the meaning of the final clause of claim 1 of the '919 patent, which recites, "whereby need for a reference ground conductor between said transmitter and said adapter is eliminated." That is, because the adapter receives inverse video signals from an amplifier located on a transmitter, and because the adapter is able to determine the "ground" information from these signals alone, there is no need to send ground information from the transmitter to the adapter *by way of an additional conductor*.

Avocent's response is that the phrase "for said transmitter" is unambiguous on its face, and needs no construction at all. Avocent's argument has some appeal because it leaves the claim language undisturbed. Even so, the court cannot agree that the phrase "for said transmitter" is unambiguous, particularly when it is viewed in the context of the "whereby" clause that follows.


ClearCube's claim construction is persuasive not only because it naturally aligns with the embodiment in the specification, but because it is consistent with the surrounding claim language, and it comprehends the patentees' invention as a whole. ClearCube's construction of adapter, focusing on the phrase "for said transmitter," will be adopted.

PART FIVE

Conclusion

In accordance with the foregoing, the court will adopt the following constructions of the disputed terms. “Twisted pair” wiring, which is used to achieve transmission of analog video signals in the ‘919 patent, may be either “shielded” or “unshielded.” An “amplifier,” as it is claimed in both the ‘997 and ‘919 patents, is a “circuit (or a device when connected in a circuit) that draws power from a source other than the input signal and provides an output signal that reproduces the essential features of the input signal.” The claim term “discrete,” as it is used in both the ‘997 and ‘919 patents, simply means that a color video signal (*e.g.*, red) is separate or distinct from the other two color video signals. Finally, the phrase “for said transmitter,” as recited in claim 1 of the ‘919 patent, shall be construed to mean “from the signals received from the transmitter.”

DONE this 15th day of March, 2006.


United States District Judge